

***Comparisons between 2012 & 2013
within TAMU in High Impact Practices (HIP)
of the Student Experiences in Research
University (SERU)***

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Research Purpose & Significance

As for the adequate and interpretable dimensions of the constructs of high impact practices (HIP) that have been already verified for construct validities through the inspective and advanced analyses such as Confirmatory Factor Analysis (CFA), and Multiple Indicators and Multiple Causes (MIMIC) approaches, the Research aims:

- To test whether the constructs are measured without bias or not (i.e., measurement invariance) across 2012 and 2013 for TAMU students.
- To examine the changes in those constructs for TAMU students across 2012 and 2013

Therefore, this study can offer the accurate and understandable information about:

the longitudinal growth of TAMU students' high impact practices across the recent two years.

HIP Constructs:

1. Students' Preferences for Learning Practices

- *Course-Related Project Activities (CRPA)*
- *Extra-Curricular Project Activities (ECPA)*
- *Advanced Learning Activities (ADLA)*
- *Shared Learning Programs (SHLP)*
- *Intensive Writing and Global Learning Courses (IWGLC)*

2. Global Experiences & Global Competences

- *Direct and Practical Global Experiences (DPGE)*
- *Peer-to-Peer Global Interactions (PPGI)*
- *Work and Attendance in Global Issues (WAGI)*
- *Intellectual Global Competence (ILGC)*
- *Multicultural Cooperation (MLCB)*



Analyses

- Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) with Categorical Variables through the Robust Weighted Least Square Estimation , using Mplus for construct specifications.
- Multi-group Confirmatory Factor Analysis (MGCFA) with mean structures for testing of measurement invariance and the change across two years.

Samples

Year	2012	2013
n of TAMU participants	6524	7219

Testing for *Measurement Invariance (MI)* across 2012 and 2013 for TAMU:

Domain	Model	χ^2	df	CFI	RMSEA	RMSEA 90% CI	Δ CFI
Learning Preferences of 5 factors	Non-Constraints but Factor mean and variance were equal to 0 and 1, respectively for identifications.	2772.53	440	.914	.031	.030-.032	
	Equal Loadings & intercepts (Thresholds).	2731.24	476	.917	.019	.017-.021	
Global Practice Patterns and Competence of 5 factors	Non-Constraints but Factor mean and variance were equal to 0 and 1, respectively for identifications.	3137.44	260	.917	.075	.073-.078	.
	Equal Loadings & intercepts (Thresholds).	2901.78	314	.926	.065	.063-.067	

Measurement Constructs & Differences : Learning Preference 1

Course-Related Project Activities	Reliability (α)		Factor Loadings	
	2012:	2013:	2012	2013
	.62	.64		
A research project, creative activity, or paper as part of your coursework			.66	.62
At least one student research course			.77	.76
At least one independent study course			.73	.70
Assist faculty in research with course credit			.78	.81
Work on creative projects under the direction of faculty with course credit			.57	.63

Extra-Curricular Project Activities	Reliability (α)		Factor Loadings	
	2012:	2013:	2012	2013
	.65	.70		
Assist faculty in research for pay without course credit			.76	.76
Assist faculty in research as a volunteer without course credit			.77	.78
Work on creative projects under the direction of faculty for pay without course credit			.90	.90
Work on creative projects under the direction of faculty as a volunteer without course credit			.80	.84

Factor	Mean Differences	P value (2-tailed)	Z	Interpretation
Course-Related Project Activities	Δ .09 2012 > 2013	.000	-3.76	TAMU students are more likely to decrease in Course-Related Project Activities for 2013 as compared for 2012.
Extra-Curricular Project Activities	Δ .13 2012 > 2013	.006	-2.77	TAMU students are more likely to decrease in Extra-Curricular Project Activities for 2013 as compared for 2012.

Measurement Constructs & Differences : Learning Preference 2

Advanced Learning Activities	Reliability (α)		Factor Loadings	
	2012: .59	2013: .63	2012	2013
Capstone or senior thesis courses 39			.64	.65
Formal undergraduate research programs 41			.85	.84
Formal creative activity or scholarship (such as in published collection, play, or gallery exhibit) 42			.65	.70
Honors program 43			.44	.47
Internship under the direction of a faculty member 45			.72	.72
Other internship (e.g., coop, clinical assignment) 46			.50	.46

Factor	Mean Differences	P value (2-tailed)	Z	Interpretation
Advanced Learning Activities	Δ .17 2012 < 2013	.039	2.06	TAMU students are more likely to increase in Advanced Learning Activities for 2013 as compared for 2012.

Measurement Constructs & Differences : Learning Preference 3

Shared Learning Programs	Reliability (α)		Factor Loadings	
	2012: .53	2013: .56	2012	2013
First-year seminar 34			.36	.44
Learning community (two or more linked classes across a common theme) 35			.59	.61
Reading a book that is common across the university (e.g. common book) 36			.53	.52
Service learning or community-based learning 40			.75	.72
Living-learning programs 44			.65	.72

Intensive Writing and Global Courses	Reliability (α)		Factor Loadings	
	2012: .52	2013: .54	2012	2013
Writing-intensive courses 37			.62	.66
Courses that involve themes related to diversity or global learning 38			.88	.86
Enrolled in a course with an international/global focus 52			.59	.57

Factor	Mean Differences	P value (2-tailed)	Z	Interpretation
Shared Learning Programs	Δ .13 2012 < 2013	.027	2.217	TAMU students are more likely to increase in Shared Learning Programs for 2013 as compared for 2012.
Intensive Writing and Global Courses	Δ .14 2012 > 2013	.055 (NS)	-1.917	TAMU students are non-significantly to decrease in Intensive Writing and Global Courses for 2013 as compared for 2012.

Measurement Constructs & Differences : Global Experiences1

Direct and Practical Global Experiences	Reliability (α)		Factor Loadings	
	2012:	2013:	2012	2013
Any [home campus] study abroad, including summer study abroad 47	.69	.73	.66	.72
Study abroad program affiliated with another college or university 48			.73	.77
Traveled abroad for a service learning, volunteer, or work experience 49			.78	.80
Traveled abroad for cross-cultural experience or informal education 50			.90	.91
Traveled abroad for recreation 51			.65	.68
Obtained a certificate/minor/major with an international/global theme (e.g., in Latin American Studies) 53			.77	.75

Factor	Mean Differences	P value (2-tailed)	Z	Interpretation
Direct and Practical Global Experiences	Δ .014 2012 > 2013	.845(NS)	-0.196	No Difference

Measurement Constructs & Differences : Global Experiences 2

Peer-to-Peer Global Interactions	Reliability (α)		Factor Loadings	
	2012: .90	2013: .89	2012	2013
Interacted with students from outside the U.S. in class (e.g., through section discussions, study groups or class projects) 54			.82	.81
Interacted with students from outside the U.S. in social settings (e.g., in clubs or student organizations, or in informal settings) 55			.93	.93
Developed a friendship with a student from outside the U.S. 56			.91	.90

Work and Attendance in Global Issues	Reliability (α)		Factor Loadings	
	2012: .85	2013: .87	2012	2013
Worked with a faculty member on a project with an international/global theme 57			.83	.85
Presented a paper at a symposium or conference or participated in a panel on international/global topics 58			.84	.87
Attended lectures, symposia, workshops or conferences on international/global topics 59			.86	.88
Attended a performance with an international/global focus 60			.85	.85

Factor	Mean Differences	P value (2-tailed)	Z	Interpretation
Peer-to-Peer Global Interactions	Δ .10 2012 < 2013	.019	2.347	TAMU students are more likely to increase in Peer-to-Peer Global Interactions for 2013 as compared for 2012.
Work and Attendance in Global Issues	Δ .002 2012 > 2013	.969(NS)	-0.039	No Difference

Measurement Constructs & Differences : Global Competence

Intellectual Global Competence	Reliability (α)		Factor Loadings	
	2012: .73	2013: .74	2012	2013
Understanding of the complexities of global issues 68			.76	.75
Ability to apply disciplinary knowledge in a global context 69			.82	.80
Linguistic and cultural competency in at least one language other than my own 70			.58	.62

Multicultural Cooperation	Reliability (α)		Factor Loadings	
	2012: .91	2013: .90	2012	2013
Ability to work with people from other cultures 71			.96	.96
Comfort working with people from other cultures 72			.88	.86

Factor	Mean Differences	P value (2-tailed)	Z	Interpretation
Intellectual Global Competence	Δ .14 2012 < 2013	0.003	2.977	TAMU students are more likely to increase in Intellectual Global Competence for 2013 as compared for 2012.
Multicultural Cooperation	Δ .071 2012 < 2013	.294(NS)	1.049	No Difference

Conclusion

Overall , the multiple group analyses across 2012 and 2013 for TAMU students yielded several implications:

- Regarding learning preferences, TAMU students showed the increase in Advanced and shared learning activities, while the decrease in course-related and extra-curricular project activities. There is no difference in intensive writing and global courses across 2012 and 2013.
- In terms of global practice patterns and competence, TAMU students showed the increase in peer-to-peer global interactions, but no differences in direct and practical global experiences and attendance in global issues across 2012 and 2013.
- Also, TAMU students showed their self-perceptions of improvement in intellectual global competence, but no difference in multicultural cooperation across 2012 and 2013.